

## Synthesis and characterization of cobalt ferrite nanoparticles by hydrothermal method for biomedical applications

Duong Thi Hong Diu, 김교선<sup>1,†</sup>

Kangwon National University; <sup>1</sup>강원대학교

(kkyoseon@kangwon.ac.kr<sup>†</sup>)

Cobalt ferrite nanoparticles (NPs) have attracted considerable attention for their high potential in biomedical applications such as drug delivery, hyperthermia, biosensors. Hydrothermal treatment in fatty acid-water-ethanol system is proposed to prepare the high-quality hydrophobic particles. In this study, single-phase cobalt ferrite NPs of controlled size (~7 nm) have been synthesized by hydrothermal method using oleic acid as a surfactant. We clarified the formation mechanism of NPs and the role of oleic acid by altering oleic acid concentration, heating time, and reaction temperature. Without the oleic acid, agglomerated NPs with a crystallite size of about 17 nm were obtained. By addition of oleic acid, the size of the cobalt ferrite coated oleic acid (CFO) NPs decreases and above critical concentration of oleic acid (~0.1 M), well-dispersed, non-agglomerated and nearly spherical particles were prepared. FT-IR and thermogravimetric analysis (TGA) was used to calculate the amount of coated oleic acid and identify the nature of its bonding to the surface of cobalt ferrite NPs for different reaction times and oleic acid concentrations.